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IN THE UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS SHERMAN DIVISION

RAYTHEON COMPANY, Plaintiff, v. INDIGO SYSTEMS CORPORATION and FLIR SYSTEMS, INC., Defendants.	CIVIL ACTION NO. 4:07-CV-109

CLAIM CONSTRUCTION ORDER

After considering the submissions and the arguments of counsel, the court issues the following order concerning claim construction issues:

I. INTRODUCTION

Plaintiff Raytheon Company ("Plaintiff") accuses defendants Indigo Systems Corporation and FLIR Systems, Inc. (collectively "Defendants") of infringing claims of four United States patents: (1) U.S. Patent No. 5,021,663 ("the '663 patent"), entitled Infrared Detector; (2) U.S. Patent No. 5,449,943 ("the '943 patent"), entitled Visible and Infrared Indium Antimonide (InSb) Photodetector with Non-Flashing Light Receiving Surface; (3) U.S. Patent No. 5,646,437 ("the '437 patent"), entitled Indium Antimonide (InSb) Photodetector Device and Structure for Infrared, Visible and Ultraviolet Radiation; and (4) U.S. Patent No. 5,043,820 ('the '820 patent"), entitled Focal Plane Array Readout Employing One Capacitive Feedback Transimpedance Amplifier For Each Column. Raytheon alleges infringement of claims 18, 22, 26-28, 33, and 35-38 of the '663 patent, claims 1-5 and 9-12 of the '943 patent, claims 1-8 and

11-15 of the '437 patent, and claims 1, 2, 4 and 5 of the '820 patent. This order resolves the parties' various claim construction disputes.

II. GENERAL PRINCIPLES OF CLAIM CONSTRUCTION

"A claim in a patent provides the metes and bounds of the right which the patent confers on the patentee to exclude others from making, using or selling the protected invention." *Burke, Inc. v. Bruno Indep. Living Aids, Inc.,* 183 F.3d 1334, 1340 (Fed. Cir. 1999). Claim construction is an issue of law for the court to decide. *Markman v. Westview Instruments, Inc.,* 52 F.3d 967, 970-71 (Fed. Cir. 1995) (en banc).

To ascertain the meaning of claims, the court looks to three primary sources: the claims, the specification, and the prosecution history. *Markman*, 52 F.3d at 979. A patent's claims must be read in view of the specification, of which they are a part. *Id.* Under 35 U.S.C. § 112, the specification must contain a written description of the invention that enables one of ordinary skill in the art to make and use the invention. For claim construction purposes, the description may act as a sort of dictionary, which explains the invention and may define terms used in the claims. *Markman*, 52 F.3d at 979.

Nonetheless, it is the function of the claims, not the specification, to set forth the limits of the patentee's claims. Otherwise, there would be no need for claims. *SRI Int'l v. Matsushita Elec. Corp.*, 775 F.2d 1107, 1121 (Fed. Cir. 1985) (en banc). The patentee is free to be his own lexicographer, but any special definition given to a word must be clearly set forth in the specification. *Intellicall, Inc. v. Phonometrics,* 952 F.2d 1384, 1388 (Fed. Cir. 1992). Although the specification may indicate that certain embodiments are preferred, particular embodiments appearing in the specification will not be read into the claims when the claim language is broader

than the embodiments. *Electro Med. Sys., S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 1054 (Fed. Cir. 1994).

The court's claim construction analysis is informed by the Federal Circuit's decision in *Phillips v. AWH Corporation,* 415 F.3d 1303 (Fed. Cir. 2005) (en banc). In *Phillips*, the court set forth several guideposts that courts should follow when construing claims. In particular, the court reiterated that "the claims of a patent define the invention to which the patentee is entitled the right to exclude." 415 F.3d at 1312 (emphasis added) (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). To that end, the words used in a claim are generally given their ordinary and customary meaning. *Id*. The ordinary and customary meaning of a claim term "is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, *i.e.*, as of the effective filing date of the patent application." *Id*. at 1313.

The primacy of claim terms notwithstanding, *Phillips* made clear that "the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id*. Although the claims themselves may provide guidance as to the meaning of particular terms, those terms are part of "a fully integrated written instrument." *Id*. at 1315 (quoting *Markman*, 52 F.3d at 978). Thus, *Phillips* emphasized the specification as being the primary basis for construing the claims. *Id*. at 1314-17. The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction. Consequently, *Phillips* emphasized the important role the specification plays in the claim construction process.

The prosecution history also plays an important role in claim interpretation. The prosecution history helps to demonstrate how the inventor and the PTO understood the patent. *Phillips*, 415 F.3d at 1317. Because the file history, however, "represents an ongoing negotiation between the PTO and the applicant," it may lack the clarity of the specification and thus be less useful in claim construction proceedings. *Id*. Nevertheless, the prosecution history is intrinsic evidence and is relevant to determining how the inventor understood the invention and whether the inventor limited the invention during prosecution by narrowing the scope of the claims.

Phillips rejected a claim construction approach that sacrificed the intrinsic record in favor of extrinsic evidence, such as dictionary definitions or expert testimony. The *en banc* court rejected the suggestion made by *Texas Digital Systems, Inc. v. Telegenix, Inc.*, 308 F.3d 1193 (Fed. Cir. 2002), that a court should discern the ordinary meaning of the claim terms (through dictionaries or otherwise) before resorting to the specification for certain limited purposes. *Id*. at 1319-24. According to *Phillips*, reliance on dictionary definitions at the expense of the specification had the effect of "focus[ing] the inquiry on the abstract meaning of words rather than on the meaning of the claim terms within the context of the patent." *Id*. at 1321. *Phillips* did not, however, preclude all use of dictionaries in claim construction proceedings. Instead, the court assigned dictionaries a role subordinate to the intrinsic record. *Id*. at 1323-25.

Claims drafted pursuant to 35 U.S.C. § 112, ¶ 6 are construed differently. Under 35 U.S.C. § 112, ¶ 6, "A patentee may express . . . an element in a claim for a combination . . . as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." By claiming in means-

plus-function form, a patentee is allowed to claim a function without expressing all of the possible means of accomplishing that function. *See O.I. Corp. v. Tekmar Co.*, 115 F.3d 1576, 1583 (Fed. Cir. 1997). "The price that must be paid for use of that convenience is limitation of the claim to the means specified in the written description and equivalents thereof." *Id.*

In construing a means-plus-function claim element, the court must undertake a two-step analysis. *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1321 (Fed. Cir. 2003). First, the court must determine the function performed by the means-plus-function element. *Id.* Second, the court must identify the corresponding structure that the patentee has clearly linked or associated with the claimed function. *Id.* If the specification has not clearly linked a structure to a claimed function, then the claim is indefinite. *Id*.

With these principles in mind, the court now turns to a discussion of the relevant claim terms.

III. THE '663 PATENT

A. Background of the Technology

The '663 Patent is generally directed to uncooled bolometers for detection of infrared radiation. '663 patent, 1:9-11. The elements in an infrared detector that sense infrared radiation are referred to as bolometers, with each bolometer representing a pixel in the displayed image. Bolometers are typically arranged in a grid. Bolometers include a temperature-sensitive resistor whose electrical resistance changes depending on the amount of radiation (heat) absorbed. *See* '663 patent, 1:65-67; 3:14-19. Changes in electrical resistance allow circuitry connected to the bolometer to re-create an image based on differences in heat absorbed by the various bolometers in an array.

Infrared radiation is radiation just outside the spectrum of visible light. It includes radiation with lower frequencies and thus longer wavelengths than visible light. Infrared radiation is emitted by warm objects, such as bodies, and infrared detectors are able to display images of those objects in settings where humans are unable to see with the naked eye. Infrared detectors are the technology behind, for example, "night vision".

Uncooled, infrared detectors, the subject of the '663 Patent, are less sensitive than cooled infrared detectors and are generally used in situations where the additional power consumed by the cooled infrared detector and/or the weight of the additional cooling components is impractical or undesired. For example, uncooled, infrared detectors may be used in night vision goggles, while cooled, infrared detectors may be mounted on an aircraft to allow for a much more accurate and detailed image.

The '663 Patent describes a bolometer comprising a layer of resistive material surrounded by conductive materials. According to the specification, the claimed bolometer – unlike the prior art – maximizes the image quality by suspending the bolometer above the circuitry by "about one quarter wavelength" of the center of the spectral range to be detected. Suspending the circuitry about one quarter wavelength, according to the patent, maximizes reflection (and thus detection) of infrared radiation.

B. Agreed Constructions

The parties have agreed to the following constructions with respect to the '663 Patent:

Claim term (claim)	Agreed construction
An array of bolometers (22, 28, 33, 35, 36, 37, 38)	An array of structures that detect radiation by measuring a temperature change of resistance of thermally isolated thin metal films or semiconductor films
Said circuitry (18)	Bolometer circuitry
Bottom most surface of the corresponding variable resistor (27)	Bottom surface of the resistor
Selected area (22, 37)	Portion of the substrate covered by the resistor
Nominal top surface of a circuit element set (27)	Top surface of the circuit elements sets
Bolometer circuit elements sets (22, 33, 35, 36)	A plurality of sets, each set comprising bolometer circuit elements
Spectral range (18, 22, 26, 27, 28, 33, 35, 36, 37, 38)	Detectable range from the lowest wavelength to the highest wavelength
Pixels (28, 38)	Single elements in an array of repeating imaging elements

C. Disputed Constructions

The parties dispute the construction of eight terms of the '663 patent.

1. Resistor stack (claim 18)

Plaintiff contends that "resistor stack" means "resistor formed as a layered structure," while Defendants contend that this term means "structure having a resistive material between two layers of conductive material that are designed to carry electrical current and absorb infrared radiation."

The "Summary of the Invention" section of the '663 specification describes that "[t]he present invention provides infrared radiation imagers in the form of a monolithic array of bolometers with a high fill factor geometry together with high sensitivity resistance material. Preferred embodiments use . . . an architecture suspending the resistance material over silicon

detection circuitry." '663 patent, 2:20-27. The term "resistor stack" in claim 18 refers to the "high sensitivity resistance material" that is suspended over the silicon detection circuitry.

Stack 144 of a preferred embodiment, illustrated in Fig. 4a of the '663 patent, is a structure comprising resistive material (150) between two layers of conductive material (148 and 152), as Defendants' proposed construction requires. *See* '663 patent, 2:23-26, 3:37-43 The crux of the parties' dispute, however, is whether the term "resistor stack" is limited to this single embodiment disclosed in the specification—a layer of resistive material "sandwiched" between two layers of conductive material.

Defendants argue that the '663 patent only discloses a single embodiment and, therefore, that the inventor did not conceive of any resistor stack other than the single disclosed "sandwich" embodiment. Accordingly, Defendants argue, the claims should be limited to a "sandwich" structure. The Federal Circuit, however, "has expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment. Even when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction." *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004) (citations omitted). Defendants have not identified any such words or expressions of manifest exclusion or restriction or other intrinsic support for limiting this term to only the preferred embodiment described in the specification.

The Federal Circuit has also made clear that "a particular embodiment appearing in the specification may not be read into a claim when the claim language is broader than the embodiment." *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004).

The term "resistor stack" appears only in independent claim 18 and dependent claim 20, while other independent claims use the term "stack" modified by subsequent claim language specifically requiring a "sandwich" structure. For example, claim 1 requires a "stack including a first conductive layer, a resistive layer, and a second conductive layer . . . ." Claim 1, therefore, was drafted to more narrowly claim the "sandwich" embodiment that Defendants' proposed construction would require. Claim 18's "resistor stack," however, does not include subsequent qualifying language and was thus intended to be broader than the "sandwich" embodiment.

Indeed, claim 20, which depends from independent claim 18, requires that the "resistor stack" of claim 18 include the relevant elements of the "sandwich" embodiment. If the "resistor stack" of claim 18 was already limited to the "sandwich" embodiment, claim 20 would be redundant and would add no additional limitations. Such a construction would be improper. *See* 35 U.S.C. § 112, ¶ 4; *Robotic Vision Sys. v. View Eng'g, Inc.*, 189 F.3d 1370, 1376 (Fed. Cir. 1999) ("If claim 1 were limited to separate fabrication of index pads, claim 4 would necessarily be redundant and add no additional limitations. This would again be an absurd construction of claim 4 as a dependent claim of claim 1."). The term "resistor stack" is broader than the "sandwich" embodiment discussed in the specification and specifically claimed in, for example, independent claim 1 and dependent claim 20.

Defendants also rely on the "Modification and Advantages" portion of the specification in support of their proposed construction, which states:

> Various modifications of the preferred embodiment devices and methods may be made while retaining features such as [1] a temperature dependent resistor suspended over related processing circuitry for a high fill factor and avoidance of resistor edge passivation, [2] a temperature dependent resistor made of a radiation absorbing material on a transparent high temperature coefficient material, [3] a quarter wavelength filter absorber, and [4] in situ deposition of resistor materials for uniform and reproducible resistors.

‘663 patent, 11:9-18. Thus, according to Defendants, the specification lists four features of the devices and methods that must be maintained according to the inventors. Defendants point to the second feature—“a temperature dependent resistor made of a radiation absorbing material [conductive material] on a transparent high temperature coefficient material [resistive material]”—to argue that the disclosed “sandwich” embodiment is a critical feature of the invention that must be present in every embodiment.

However, even assuming Defendants’ assertion that this portion of the patent recites features that must be present in any covered embodiment, the cited portion of the specification does not say that the resistor must necessarily be a “sandwich” configuration. Rather, it clarifies that the resistor comprises at least a conductive material on a resistive material, which may or may not contain an additional conductive material to form a “sandwich” structure. This portion of the specification does, however, identify “in situ deposition of resistor materials for uniform and reproducible resistors” as one of the four features. The specification thus clarifies that the resistor “stack” of the present invention may be formed by in situ deposition, *i.e.*, formed as a layered structure.

For all of these reasons, the court construes “resistor stack” to mean “resistor formed as a layered structure.”

2. Resistor(s) (claims 22, 26-28, 33, 35-38)

Plaintiff contends that “resistor,” as used in the claims, means “element used to offer resistance to an electric circuit,” while Defendants contend it means “portion of the resistor stack between the leads.” The specification does not purport to alter the ordinary meaning of this common component of an electric circuit, and neither party argues otherwise. The parties’ primary dispute concerning this construction is whether a jury would be best aided by a

construction defining "resistor(s)" in functional terms or in terms of the location of the circuit component.

When discussing a preferred embodiment, the specification describes that "[a]s shown in Fig. 5a, stack 144 is square with two pairs of elongated openings 160, 162, and 164, 166 defining leads 170 and 174 between interconnects 156 and 158 and the remainder of stack 144 (resistor 141)." '663 patent, 3:46-50. In a preferred embodiment, then, resistor 141 is "the remainder of stack 144" other than the leads and interconnects—the "portion of the resistor stack between the leads," in addition to the remainder of the resistor stack, other than the leads and interconnects, that is not between the leads.

Although "resistor 141," as illustrated in Fig. 4a, is indeed "between the leads," the court finds that construing "resistor" based solely on the label in Fig. 4a is unduly restrictive. For example, the only portion of resistor 141 in Fig. 5a that might arguably be considered a "resistor" under Defendants' proposed construction would be the narrow sliver of resistor 141 running diagonally between the ends of the leads. However, as discussed above, the specification makes clear that resistor 141 is "the remainder of stack 144."

Defendants' proposed construction also defines resistor with reference to "resistor stack," a disputed term that does not appear in the claims in which "resistor(s)," standing alone, appears. Defendants' proposed construction thus potentially imports the additional limitation of a "resistor stack" into the claims containing only the "resistor(s)" requirement. As discussed above, "resistor stack" appears only in independent claim 18 and dependent claim 20; the term "resistor(s)" appears only in claims 22, 26-28, 33, and 35-38. The court declines to construe "resistor(s)" with reference to a disputed term from different claims.

Moreover, the court finds that use of the word "element" in Plaintiff's proposed construction is potentially confusing to a jury. "Component of an electric circuit" is a more precise description of a resistor. In the same vein, rather than offering "resistance to an electric circuit," a resistor offers resistance to the flow of an electric current in an electric circuit.

Because the patentee did not purport to alter the ordinary meaning of "resistor," and because the court finds that Defendants' proposed construction is unduly restrictive and potentially imports the limitation of a "resistor stack," the court construes "resistor(s)" to mean "component(s) of an electric circuit used to offer resistance to the flow of an electric current."

3. A radiation absorbing material with a sheet resistance providing at least 50% absorption in said spectral range (claims 35-38)

Plaintiff argues that this term means "material having sheet resistance, wherein the material absorbs at least 50% of incident radiation in the specified spectral range." Though Defendants originally proposed a different construction, they agreed at the *Markman* hearing that this term means "a layer of material that absorbs, through its sheet resistance, at least 50% of incident radiation in the specified spectral range."[1] *See* Transcript of April 9, 2008 *Markman* Hearing ("*Markman* Tr."), 68:7-8. Moreover, both parties agreed at the *Markman* hearing that sheet resistance provides radiation absorption.

The specification describes that "free carrier absorption [] can be optimized by choice of resistivity, thickness, and gap from stack 144 to ground plane 192." '663 patent, 7:53-56. The patent then explains that Fig. 7 illustrates the absorption A on a metal film of thickness t and resistivity ρ, with absorption A approaching slightly less than 50% absorption at its peak. *Id*. at 7:57-65; Fig. 7. It then describes how "the addition of a thick conducting layer parallel to the

[1] The court initially proposed a similar construction—substituting "effective sheet resistance" for "sheet resistance"—to account for the radiation reflected from the ground plane, as discussed herein, although both parties argued that the meaning of "effective sheet resistance" is unclear.

metal film and at a distance of 1/4λ away" increases absorption to nearly 100%. *Id*. at 7:66-8:2. The specification, therefore, describes how the spacing of a radiation absorbing material at a distance of 1/4 wavelength from a thick conductive layer will significantly enhance the absorption capability of the radiation absorbing material. Indeed, the "Summary of the Invention" portion of the specification explains that "[t]he distance between the suspended resistance material and the underlying reflective substrate is one-quarter of the wavelength of the center of the infrared spectral band and provides enhanced infrared absorption." '663 patent, 2:27-31.

Describing a preferred embodiment, bolometer 140, the specification then describes that "the distance from electrodes 148 and 152 to ground plane 192 is set at" one quarter wavelength. *Id.* at 8:3-7. Given this 1/4λ spacing, the specification explains that "only the ratio of resistivity-to-thickness enters into the absorption analysis" (i.e., because the spacing has already been determined) and that adjustments may be made to compensate for the resistivity of the material to allow for greater absorption. *Id*. at 8:18-25. Defendants argue that this statement means that only resistivity and thickness enter into the absorption analysis at any point, although the specification's description of absorption and the preferred embodiment in columns 7 and 8 clarifies that each of resistivity, thickness, and spacing is a factor in a material's ability to absorb radiation. *See id.* at 7:53-56. The specification statement upon which Defendants rely reiterates that resistivity and thickness are the only factors that enter into the absorption analysis after spacing has been determined.

Plaintiff's primary concern with the court's proposed construction at the *Markman* hearing was that "a layer of material that absorbs, through its sheet resistance, at least 50% of incident radiation in the specified spectral range" is ambiguous in that it appears to require that

the sheet resistance *alone*—without regard for the spacing from the ground plane and without regard for any radiation reflected from the ground plane—absorbs at least 50% of incident radiation. However, the court's construction necessarily takes into account the total incident radiation absorption, including incident radiation initially absorbed by the sheet resistance and incident radiation absorbed by the sheet resistance as a result of the positioning of the layer of material (e.g., absorption after reflection from the ground plane).

The court construes "a radiation absorbing material with a sheet resistance providing at least 50% absorption in said spectral range**"** to mean "a layer of material that absorbs, through its sheet resistance, at least 50% of incident radiation in the specified spectral range."

4. Substantially cover (claims 22, 37)

Plaintiff contends that "substantially cover" does not need to be construed, while Defendants contend that it should be construed to mean "cover nearly all of." In support, Defendants argue that the resistors illustrated in Figs. 5a and 5b "cover nearly all of" the surface and that a jury would be aided by their proposed construction. Defendants' construction, however, merely replaces the language as drafted with language of no greater clarity. Moreover, "cover nearly all of" is potentially more stringent than "substantially," which would alter the scope of the claim as drafted, and is based solely on a preferred embodiment illustrated in the figures of the '663 patent. *See SuperGuide*, 358 F.3d at 875.

Because Defendants' proposed construction potentially alters the scope of the term "substantially," and because it does not add clarity to the claim language as drafted, the court declines to construe this term.[2] *See U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997) ("Claim construction is a matter of resolution of disputed meanings and

[2] At the *Markman* hearing, the parties appeared to dispute which "selected area" must be "substantially cover[ed]," more so than than the meaning of "substantially cover," although the parties have agreed to the construction of "selected area."

technical scope, to clarify and when necessary to explain what the patentee covered by the claims . . . .").

5. Spacer layer defining a well (claims 28, 38)

Plaintiff contends that "spacer layer defining a well" means "a layer that defines a gap that will be created when the layer is removed," while Defendants contend that it means "a layer forming walls that define an empty space."

The terms "spacer layer" and "well" appear only in the claims of the '663 patent. Neither term appears anywhere else in the specification. As described below, however, the claims and the specification reveal that the "spacer layer" is polyimide layer 196 in a preferred embodiment, while the "well" that the spacer layer defines is the space that exists between the resistor and the ground plane in a completed bolometer (the "vacuum gap" illustrated in Fig. 4a).

The claimed "spacer layer" is the polyimide layer 196 described in a preferred embodiment method of the '663 specification. *See* '663 patent, 9:8-10:12. As described in the specification, the polyimide layer 196 is deposited in step (b) prior to depositing, *in situ*, the layers that will form stack 144. *Id.* at 9:8-19. As illustrated in Figs. 8b-8g, the thickness of the spacer layer defines the spacing between stack 144 and the aluminum layer 192 in the completed bolometer, because the layers that form stack 144 are deposited on top of polyimide layer 196 during the fabrication process. *See id*. at 9:18-29; Fig. 8c. The specification describes how, after the layers of stack 144 are deposited *in situ* (among other steps), the photoresist layers 204 and 208, together with the polyimide layer 196, are etched away to leave the completed bolometer. *Id*. at 10:9-11. The "spacer layer" is thus used during the fabrication process to define the spacing between the resistor and the ground plane in the completed bolometer, but is thereafter etched away—it is not a physical layer that exists in the completed bolometer.

Defendants' primary argument in opposition to Plaintiff's proposed construction is that the claims in which this term appears are directed to a final, functional array of bolometers, and, therefore, the claimed "spacer layer" must be a physical layer that is present in the completed bolometer (and not a layer that has been removed). In support of this argument, Defendants rely on the preamble, which states "An array of bolometers having resistors which vary with received radiation in a spectral range of infrared radiation . . . ." '663 Reexamination Certificate, 3:48-50; 6:17-19. According to Defendants, the resistor that exists in an intermediate bolometer in the fabrication process (such as that illustrated in Fig. 8g) would not vary with received radiation, so the claim must necessarily be directed to a completed bolometer. And because the claim is directed to a completed bolometer, Defendants argue, it would be illogical to construe this term to require a "spacer layer" that is removed during the fabrication process and that does not exist in a completed bolometer.[3]

Defendants' argument is more accurately characterized as an argument for non-infringement than an argument related to construction of this term. Whether the resistor in an intermediate bolometer in the fabrication process, such as that illustrated in Fig. 8g, varies with received radiation is a fact question better left to the jury. According to Defendants' argument, either the claims are directed to a completed bolometer, in which case a "spacer layer" is no longer present (and a requirement of the claims would be missing), or the claims are directed to an intermediate bolometer, in which case the resistors do not vary with received radiation (and a requirement of the claims would be missing).[4]

[3] Defendants also point to subsequent claim language requiring "resistors supported by said spacer layer" in support of their argument. According to Defendants, if the claim is directed to a completed bolometer, and the spacer layer "support[s]" the resistors, the "spacer layer" must necessarily be in existence in the final product.

[4] The parties did not address whether or not the preambles of claims 28 and 38 are limitations of the claims. The court, therefore, declines to construe the preambles or determine whether they are limitations of the claims at this time.

In the context of the specification and the claims, "a layer forming walls that define an empty space" does not define a "spacer layer." Defendants did not identify any structure in the completed bolometer—either in their briefing or at the *Markman* hearing—that would qualify as a "spacer layer" under their proposed construction. Indeed, under Defendants' proposed construction (as Plaintiff points out), interconnects 156 and 158 appear to be the only structures that may possibly qualify, as they are the only structures that arguably "form[] walls that define an empty space" in the completed bolometer. The intrinsic record, however, does not support a construction that renders the interconnects a "spacer layer."

"Spacer layer," in the context of the intrinsic record, is a layer that is deposited during the fabrication process, upon which materials comprising the resistor are deposited, that is thereafter removed to form the space between the resistor and the ground plane (reflector layer). (See Fig. 4a). The court, therefore, construes this term to mean "a layer that defines a space that will be created when the layer is removed." Indeed, when read in conjunction with the next disputed claim term ("supported by said spacer layer"), it is clear that the "spacer layer" is a layer, such as polyimide layer 196, that supports the resistor during the fabrication process and that defines a space that will be created when the layer is removed.

6. Supported by said spacer layer (claims 28, 38)

Plaintiff contends that this term means "formed on said spacer layer," while Defendants contend that it means "held up by the spacer layer." Defendants' proposed construction comports with the ordinary meaning of "supported" (i.e., "held up"), while Plaintiff's construction does not.

As described above, the spacer layer is used during the fabrication process to support the resistor and define a space that will be created when the layer is removed. Accordingly, the

parties' proposed constructions do not meaningfully differ, that is, the resistors are formed on the spacer layer and, therefore, are held up by the spacer layer during the fabrication process. Because neither party's proposed construction adds clarity to this term, and because a jury will readily understand the meaning of this term, the court declines to construe "supported by said spacer layer." *See U.S. Surgical Corp.*, 103 F.3d at 1568.

7. About one quarter wavelength of the center of [a spectral range of infrared radiation having wavelengths of 8-12 µm/the spectral range/said spectral range] (claims 18, 26-27, 33, 35-36)

Plaintiff contends that this term means "about the result of the center of the spectral range divided by four," while Defendants contend that it means "within a few hundred angstroms of one quarter wavelength of the center of the specified spectral range." Defendants thus contend that this claim requires near absolute precision in the spacing between the resistor and the reflective layer.

The Federal Circuit has explained that "[m]athematical precision should not be imposed for its own sake; a patentee has the right to claim the invention in terms that would be understood by persons of skill in the field of the invention." *Modine Mfg. v. U.S. Int'l Trade Comm'n*, 75 F.3d 1545, 1557 (Fed. Cir. 1996). The patentee chose to claim his invention without mathematical precision, so the court will not construe this term with mathematical precision except to the extent the intrinsic record provides clear guidance.

Because the specification explains how the spacing between the resistor and the reflective layer is optimally 1/4λ of the center of the spectral range ('663 patent, 7:66-8:2), the specification contemplates that some degree of deviation from 1/4λ is necessarily present in a bolometer detecting any range of wavelengths. For example, 1/4λ of 8 µm wavelength radiation is 2 µm, while 1/4λ of 12 µm wavelength radiation is 3 µm (a difference of 10,000 Angstroms).

Therefore, for a bolometer that detects radiation in a range of 8-12 μm, spacing of 2.5 μm is exactly 1/4λ of the center of the 8-12 μm spectral range, yet 5000 Angstroms from 1/4λ of the radiation with wavelengths of 8 μm and 12 μm. Even when the spacing is exactly 1/4λ of the center of the spectral range, therefore, the specification contemplates that the spacing will be up to 5000 Angstroms from 1/4λ for radiation having wavelengths at the ends of the range, yet still be optimally spaced.

Despite the inexact spacing inherent in any bolometer that detects radiation within a range of wavelengths, Defendants contend that this term allows for only a "few hundred angstroms" deviation from 1/4λ of the center of the spectral range. In support of this argument, Defendants cite '663 patent, 8:40-43, in which the specification explains that "Fig. 4b illustrates some of the underlying circuitry (CMOS) in substrate 142 and indicates the slight (few hundred) unevenness of ground plane 192." The specification then explains that "[t]he unevenness of ground plane 192 has minimal effect on the absorption." '663 patent, 8:52-53. This description in the specification, however, does not relate to the tolerance for deviation in the claimed 1/4λ spacing or provide a ceiling for maximum allowable deviation in the spacing. Instead, the specification describes how unevenness of a few hundred Angstroms in the ground plane will not materially affect the reflective properties of the ground plane (e.g., by failing to provide uniform reflection). Moreover, even if this statement related to allowable tolerance from 1/4λ spacing, it does not purport to provide a maximum amount of deviation. Instead, it simply states that a few hundred Angstroms deviation has minimal effect on the absorption capability of the bolometer.

The court thus declines to add mathematical precision to this claim through construction of this term, which the patentee chose not to include. The court construes this term to mean "about the result of the center of the spectral range divided by four."[5]

8. Supports consisting essentially of electrically conductive interconnects (claims 22, 33, 35)

Plaintiff contends that this term does not need to be construed, while Defendants contend that it means "the supports are made out of electrically conductive material and not electrically non-conductive material." The parties' primary dispute is whether the patentee limited "consisting essentially of" to mean "consisting only of" during prosecution.

Both parties acknowledge the general rule that "consisting essentially of" usually signals that the claim "is open to unlisted ingredients that do not materially affect the basic and novel properties of the invention." *PPG Indus. v. Guardian Indus. Corp.*, 156 F.3d 1351, 1354 (Fed. Cir. 1998); Plaintiff's Opening Brief at 22; Defendants' Opposition Brief at 23. Defendants argue, however, that the inventor unequivocally disavowed a certain meaning to obtain his patent. Defendants' Opposition Brief at 23-24 (citing *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003)).

Specifically, Defendants rely on an examiner interview summary dated November 18, 1996, where the patentee and the examiner discussed "[c]laims amended and/or added relating to the limitation regarding the mechanical support [consisting] solely (or essentially) of electrically conductive connections" in response to a rejection based on the Higashi et al. prior art reference. Defendants' Ex. 7 at 305. Subsequent to that interview, Defendants argue, the patentee amended

[5] In its reply brief, Plaintiff submitted an affidavit from Dr. Solomon stating that, in his opinion, "about" would mean +/- 10% in this context. The court, however, specifically declines to impose a numerical limitation to the term "about" in this claim term. Whether any degree of deviation from $1/4\lambda$ renders an array of bolometers, or a method of fabrication of an infrared imager, outside the scope of these claims due to degradation in performance, enhanced performance at a different level of spacing, manufacturing capabilities, or otherwise is a fact question better left to the jury. *See W.L. Gore Associates, Inc. v. Garlock, Inc.*, 842 F.2d 1275, 1280-81 (Fed. Cir. 1988).

claim 22 and stated that "[i]t is well known in the art that silicon nitride is an insulator, not a conductor. Higashi et al. do not teach or suggest a structure [having] supports that consist essentially of electrically conductive interconnects." Defendants' Ex. 7 at 323 (November 25, 1996 Amendment). Contrary to Defendants' argument, however, neither of these statements approaches a clear and unmistakable disclaimer of claim scope or an unequivocal disavowal of the ordinary meaning of "consisting essentially of." Indeed, the patentee distinguished Higashi et al. on the basis that the reference does not teach or suggest a structure having supports that consist essentially of electrically conductive interconnects. *Id*. Neither of the statements upon which Defendants rely purports to limit "consisting essentially of" to "consisting solely of."

Because a jury will readily understand the meaning of this term as drafted, and because the patentee did not alter the ordinary meaning of this term during prosecution of the patent, the court finds that this term does not need to be construed. *See U.S. Surgical Corp.*, 103 F.3d at 1568

IV. THE '943 and '437 PATENTS

A. Background of the Technology

The '943 and '437 Patents relate to indium antimonide (InSb) photodetectors. According to the patents, the photodetector undergoes a cleansing process to remove "carrier traps" that distort the flow of electrons through the P-N (positive-negative) junction and, as a result, distort the displayed image. "Carrier traps", as generally referenced in the specification, are impurities such as ions on the InSb substrate. The '943 and '437 patents describe how a cleansing process, followed by application of passivation layers to the InSb substrate, prevents "flashing" by removing carrier traps and preventing them from re-forming. '437 patent, 1:18-25; '943 patent, 1:10-16.

The ‘943 Patent is directed to a “non-flashing” photodetector that senses visible and infrared radiation, while the ‘437 Patent is directed to a “non-flashing” photodetector that senses visible, infrared, and ultraviolet radiation.

B. Agreed Constructions with respect to the ‘943 and ‘437 Patents:

Claim term (claim)	**Agreed Construction**
A broadband . . . photodetector device (‘943: 1, 4, 9, 11)	A device operative for detecting radiation in the visible spectrum and in the near-IR spectrum
A broadband photodetector device capable of detecting infrared (IR), visible and near-ultraviolet (UV) radiation (‘437: 1, 13)	A device operative for detecting radiation in the infrared spectrum, the visible spectrum, and near-ultraviolet spectrum
A broadband photosensitive structure (‘437: 7, 15)	A device operative for detecting radiation in the infrared spectrum, the visible spectrum, and near-ultraviolet spectrum
Passivation layer formed on said . . . light receiving surface (‘943: 1, 4, 9, 11; ‘437: 1, 7, 13, 15)	A passivation layer that is applied to the light receiving surface of the substrate
Passivation layer (‘943: 1, 2, 4, 9-12; ‘437: 1, 3-7, 11-15)	A layer applied to a surface to prevent the surface from reacting with the ambient atmosphere or additional materials
Si_3N_4 passivation layer	A passivation layer consisting primarily of Si_3N_4
Native oxides of indium or antimony (‘943: 1, 4, 9, 11)	Oxides formed through the reaction of indium or antimony with oxygen
Native oxides of any components of the substrate material (‘437: 1, 7)	Oxides formed through reaction of any component of the substrate material with oxygen
Does not produce carrier traps through reacting with InSb (‘943: 1, 4)	Does not react with InSb to produce carrier traps
Substantially native oxide-light receiving surface (‘943: 1)	Substantially native oxide-free light receiving surface
With said holes moving to said photosensitive junction without substantial interference from the visible light generated electrons (‘943: 1, 4; ‘437: 1, 7)	Plain meaning
Material is selected from the group consisting of silicon dioxide and silicon nitride (‘943: 3)	Material made from either silicon dioxide or silicon nitride but not a mixture of the two
Substantially native oxide-[free] light receiving surface (‘943: 1, 9, 11) A light receiving surface which is substantially free of native oxides (‘437: 1, 7)	A light receiving surface from which substantially all oxides of any component of the substrate material have been eliminated

Substantially no native oxides ('943: 1, 4, 9, 11)	Substantially all oxides of indium and antimony have been eliminated
Substantially free of native oxides of any components of the substrate material ('437: 1, 7)	Substantially all oxides of any component of the substrate material have been eliminated

C. Disputed Constructions

The parties dispute the construction of one term of the '943 and '437 patents. They initially disputed the construction of "passivation layer" ('943 patent, claims 1, 2, 4, 9-12; '437 patent, claims 1, 3-7, 11-15), although they announced at the *Markman* hearing that they had agreed that "passivation layer" means "a layer applied to a surface to prevent the surface from reacting with the ambient atmosphere or additional materials." *Markman* Tr. 140:3-18. The parties also initially disputed the construction of "Si_3N_4 passivation layer" ('943 patent, claim 9, 11; '437 patent, claim 13, 15), although they announced at the *Markman* hearing that they had agreed that "Si_3N_4 passivation layer" means "a passivation layer consisting primarily of Si_3N_4." *Id*. at 141:11-14.

1. Carrier traps ('943 patent, claim 1, 4, 9, 11; '437 patent, claims 1, 7, 13, 15)

Plaintiff initially contended that "carrier traps" are "ions that trap electrons and cause flashing," while Defendants initially contended that they are "traps for electrons or holes." At the *Markman* hearing, the court proposed a construction of "traps that capture electrons and thereby impede the movement of holes." Defendants agreed to this construction, while Plaintiff argued that the court's proposed construction is essentially correct, but that the construction should specify that carrier traps "cause flashing." *Markman* Tr. 166:8-168:14. The sole remaining issue for the court, therefore, is whether the construction proposed by the court at the *Markman* hearing should specify that carrier traps cause flashing.

Plaintiff argues that the essence of the invention is preventing flashing and, therefore, that this construction should specify that the carrier traps to which the claim term refers are those that cause flashing. As Defendants point out, however, the patent does not define "flashing," and Plaintiff did not purport to identify what "flashing" means to a person of ordinary skill in the art in its briefing or at the *Markman* hearing. Because the term "flashing" is not a term that a jury would readily understand, and because Plaintiff has not offered a meaning of the term that a jury would understand, the court declines to include this undefined term in the construction of this term.

Moreover, based on the briefing and the parties' arguments at the *Markman* hearing, the "flashing" phenomenon that the specification describes as being prevented in the inventions of the '437 and '943 patents (*see* '437 patent, 2:10-17; '943 patent, 1:57-64) is caused by traps capturing electrons and thereby impeding the movement of holes to the P-N junction. As the '943 specification explains:

> The present invention is based on the realization that the flashing is caused by hot electrons generated by photons of visible or ultraviolet radiation which are captured by these electron traps in the passivation layer. The trapped electrons suppress the infrared response by recombining with photogenerated minority carriers (holes for the N-type base) before they are collected in the semiconductor P-N junctions of the device.

'943 patent, 2:56-63; *see also* '437 patent, 1:47-53. The court's construction, therefore, takes into account the "flashing" phenomenon described in the patents and referenced by Plaintiff.

The court, therefore, construes "carrier traps" to mean "traps that capture electrons and thereby impede the movement of holes."

V. THE '820 PATENT

A. Background of the Technology

The '820 patent is directed to read out integrated circuits (ROICs) that store and process the output from detector elements of a photodetector array. Photodetectors are arranged in two-dimensional grids or focal plane arrays, with each detector element/cell associated with a corresponding "unit cell" in the ROIC. Each unit cell in the ROIC is a circuit that stores the accumulated charge from the associated detector element of the focal plane array. In general, the smaller the ROIC unit cells can be made, the better the resolution capability of the system. The '820 patent discloses a focal plane array readout circuit where each unit cell in the ROIC need have only one capacitor and one transistor. Thus, the invention of the '820 patent "permits high performance readouts to be constructed with very little circuitry in the unit cells." '820 patent, 1:62-64. The charge that accumulates in each unit cell is then read out and processed by a single capacitive feedback transimpedance amplifier associated with each column of detector elements of the array. *Id*. at 1:56-61.

B. Agreed Constructions

The parties do not agree to the construction of any terms of the '820 patent.

C. Disputed Constructions

The parties dispute the construction of four terms of the '820 patent, all of which appear in independent claim 1.

1. Charge storage and transfer means for receiving and storing charge derived from the detector elements of the focal plane array (claim 1)

The parties agree that this term should be construed pursuant to 35 U.S.C. § 112, ¶ 6.

a. Claimed Function

While Plaintiff argues that the claimed function is "receiving and storing charge derived from the detector elements of the focal plane array," Defendants argue that the claimed function also includes the function of transferring charge. The parties' dispute, therefore, centers on whether the claim's inclusion of "transfer" in the title of the claimed means requires that the means perform a "transferring" function in addition to the function recited after the preposition "for" in the claim.

As the Federal Circuit has cautioned, "[w]hen construing the functional statement in a means-plus-function limitation, we must take great care not to impermissibly limit the function by adopting a function different from that explicitly cited in the claim." *Generation II Orthotics, Inc. v. Medical Tech., Inc.*, 263 F.3d 1356, 1364-65 (Fed. Cir. 2001) (citation omitted). This claim term presents a unique situation because, according to the claim language, the "charge storage and transfer means" is used for "receiving and storing charge derived from the detector elements of the focal plane array," which does not necessarily perform the function of transferring the charge. In *Micro Chem., Inc. v. Great Plains Chem. Co., Inc.*, the Federal Circuit determined that the properly identified function of a means-plus-function term was signaled by the preposition "for." 194 F.3d 1250, 1258 (Fed. Cir. 1999) ("In claim 74, the properly identified function of this means-plus-function element, signaled by the preposition 'for,' is 'determining the weights of selected additives.'"). Accordingly, the court determines that the claimed function (as explicitly recited in the claim after the preposition "for") is "receiving and storing charge derived from the detector elements of the focal plane array," and does not include the function of transferring charge.[6]

[6] Moreover, neither party explains what, if anything, "transferring" would entail in addition to "receiving," so it is possible that "receiving and storing charge" is synonymous with "charge storage and transfer," in which case the court's identified function would encompass "transferring."

b. Corresponding Structure

Plaintiff argues that the structure corresponding to the claimed function is "a circuit (and equivalent structures) having a transistor coupled to a capacitor," while Defendants argue that the corresponding structure is "a single transistor coupled to a single capacitance." The parties do not dispute that the specification clearly links or associates structure with the claimed function; instead, the parties' dispute is whether this claim term is limited to a circuit consisting of a single transistor and a single capacitor, or whether it would encompass a circuit having more than one transistor and/or more than one capacitor.

Construction of a means-plus-function claim requires limiting the scope of the claim to only those structures disclosed in the specification, and the equivalents thereof. *See Valmont Indus., Inc. v. Reinke Mfg. Co.*, 983 F.2d 1039, 1042 (Fed. Cir. 1993). As described in the specification, and illustrated in Fig. 1b, the unit cell of the readout device comprises a detector input circuit 21, transistor 22, charge storage capacitor 23, vertical signal line 24, and horizontal signal line 25. '820 patent, 2:53-66. The specification does not disclose a circuit having more than a single transistor or more than a single capacitor. Additionally, the "Summary of the Invention" section of the specification clarifies that "the present invention provides for a read-out device that employs a single transistor in each unit cell." '820 patent, 1:54-58 (emphasis added). Accordingly, "[t]he present invention permits high performance readouts to be constructed with very little circuitry in the unit cells. Only a single minimum sized transistor switch is required in each unit cell to perform the read-out and reset functions for the array." *Id.* at 1:62-66 (emphasis added). The "Summary of the Invention" section of the specification also describes that, "in the disclosed embodiment,"[7] the readout circuit comprises an array of unit

[7] The specification's use of "the disclosed embodiment," in the singular further supports the court's determination that only a single embodiment—containing a single transistor and a single capacitor—is disclosed in the specification.

cells, "each cell comprising a detector input circuit, a single transistor and a single charge storage capacitor." '820 patent, 2:3-8 (emphasis added). The '820 patent, therefore, discloses only one embodiment of the unit cell, and that embodiment contains a single transistor and a single capacitor.

Plaintiff argues that claim 1 should be interpreted broadly because claim 11 specifically requires a circuit comprising a single transistor and a single capacitor. *See* '820 patent, 7:3-5. According to the doctrine of claim differentiation, Plaintiff argues that claim 1 was drafted more broadly and should not be limited to the single transistor/single capacitor embodiment. Independent claim 11, however, is not drafted in means-plus-function format, and it is not dependent on claim 1. Plaintiff's claim differentiation argument is thus unavailing, especially in light of Federal Circuit precedent requiring that a means-plus-function limitation is limited to only those structures disclosed and clearly linked to the claimed function, and equivalents thereof. *See O.I. Corp.*, 115 F.3d at 1583.

The court thus identifies the structure corresponding to the claimed function as "a circuit having a single transistor coupled to a single capacitor, and equivalent structures." Therefore, the court construes the entire term to mean "a circuit having a single transistor coupled to a single capacitor for receiving and storing charge derived from the detector elements of the focal plane array, and equivalent structures."

2. Capacitive feedback transimpedance amplifier . . . for processing charge stored in the charge storage and transfer means (claim 1)

Plaintiff contends that this term means "a capacitive feedback transimpedance amplifier that receives and processes an output of the unit cell," while Defendants contend that no

construction is necessary.[8] Because neither party proposes to construe the meaning of "capacitive feedback transimpedance amplifier," the parties' primary dispute is whether the court should construe "charge" to mean "an output," as Plaintiff suggests.

While Plaintiff argues that "charge" should be construed to include any "output," Defendants argue that Plaintiff's construction changes the meaning of the claim because the claim requires that the transimpedance amplifier "process[es] charge stored in the charge storage and transfer means of the unit cells." '820 patent, 5:58-60. Plaintiff relies on a statement in the "Summary of the Invention" section of the specification, in which the patentee explains that "a single capacitive feedback transimpedance amplifier is employed to process the outputs of each column of detector elements of the array." '820 patent, 1:56-58 (emphasis added). The court also notes that the specification additionally describes that, in the preferred embodiment, "[t]he readout circuit 10 comprises the unit cell 12 . . . whose output is coupled through the unit cell transistor 22." '820 patent, 3:31-35.

Defendants, in response, point out that the specification describes that "[t]he drain of the transistor 22 is coupled to a vertical signal line 24 which couples charge out of the unit cell 12." '820 patent, 2:64-66 (emphasis added). Accordingly, Defendants argue, the charge itself is transferred out of the unit cell to the capacitive feedback transimpedance amplifier for processing—as literally recited in the claims.

Though the specification appears to use the terms "charge" and "output" interchangeably, which suggests that the terms are synonymous (or equivalent), the court declines to substitute "output" for "charge" in claim 1. The patentee chose to use the word "charge" in this claim, which is readily understandable to a jury, and the term "output" does not add clarity.

[8] While Defendants initially proposed an alternative construction, they agreed at the *Markman* hearing that no construction is necessary. *Markman* Tr. 204:21-205:2.

Because the court declines to construe "charge" to mean "output," the court finds that no construction is necessary for this term.

3. Column multiplexing means coupled to respective ones of the capacitive feedback transimpedance amplifiers for multiplexing output signals provided thereby (claim 1)

The parties agree that this term should be construed pursuant to 35 U.S.C. § 112, ¶ 6 and that the claimed function is "multiplexing output signals." The sole dispute was whether the court's identification of corresponding structure should include the phrase "and equivalent structures." In the parties' Joint Submission Following April 9, 2008 *Markman* Hearing (Docket No. 223), the parties informed the court that they agree the phrase should be included in the construction of this term. Accordingly, the corresponding structure disclosed for performing this claimed function is "a circuit having two transistors, and equivalent structures."[9] Therefore, the court construes the entire term to mean "a circuit having two transistors for multiplexing signals, and equivalent structures."

4. Column address means coupled to the column multiplexing means for addressing each of the column multiplexing means and for coupling output signals provided thereby out of the readout circuit (claim 1)

The parties agree that this term should be construed pursuant to 35 U.S.C. § 112, ¶ 6.

a. Claimed Function

The parties agree that the claimed function is "addressing each of the column multiplexing means and coupling output signals provided thereby out of the readout circuit."

[9] Plaintiff appears to propose that "and equivalent structures" should modify "circuit," although the structure for performing the claimed function is a particular circuit, i.e., a circuit having two transistors. Any equivalent structures, therefore, must be structurally equivalent to a circuit having two transistors, not simply structurally equivalent to a circuit.

b. Disclosed Structure

Plaintiff contends that the disclosed structure clearly linked to this claimed function is "a shift register formed of a series of connected latches (and equivalent structures)," and the Defendants contend that this claim is indefinite. While the parties agree that (1) the boxes labeled 17(a)-(d) of Fig. 1a and (2) the specification statement that "[t]he column address circuitry 17 causes successive columns to be enabled" ('820 patent, 4:64-65) disclose some amount of structure, they disagree whether the disclosure is adequate under 35 U.S.C. § 112, ¶ 2.

Under 35 U.S.C. § 112, ¶ 2, claims must "particularly point[] out and distinctly claim[] the subject matter which the applicant regards as his invention." If the patentee does not comply with this obligation, the claim or claims that fail to particularly point out and distinctly claim the subject matter are invalid as indefinite. "For claim clauses containing functional limitations in 'means for' terms pursuant to § 112 ¶ 6, the claimed function and its supporting structure in the specification must be presented with sufficient particularity to satisfy the requirements of § 112 ¶ 2." *S3, Inc. v. nVIDIA Corp.*, 259 F.3d 1364, 1367-68 (Fed. Cir. 2001). A claim is indefinite if, when read in light of the specification, it does not reasonably apprise those skilled in the art of the scope of the claim. *Allen Eng'g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1348-49 (Fed. Cir. 2002). The party challenging validity must show indefiniteness by clear and convincing evidence. *Halliburton Energy Servs. v. M-I, LLC*, 514 F.3d 1244, 1249-50 (Fed. Cir. 2008).

Both Plaintiff and Defendants rely upon extrinsic evidence, including declarations of experts, for their positions. Plaintiff contends that a person of ordinary skill in the art in March 1989 would understand that boxes 17(a)-(d), in conjunction with the specification's description that the column address circuitry 17 "causes successive columns to be enabled," discloses a shift register formed of a series of connected latches. In support, Plaintiff submits a declaration from

Dr. Alan Hoffman, a former Raytheon employee, who explains how, in his opinion, the specification's disclosure unambiguously identifies a shift register formed of a series of connected latches. Plaintiff's Ex. N at ¶¶ 10-20.

Defendants, in response, submit a declaration from Mr. Kozlowski, in which Mr. Kozlowski explains that, in his opinion, a person of ordinary skill in the art in March 1989 would view the specification's disclosure as ambiguous because a variety of alternative structures—including both "decoders" and "shift registers"—could equally be used to perform the claimed function, each of which causes successive columns to be enabled. Defendants' Ex. 24 at ¶ 8. Accordingly, he reasons, a person of ordinary skill in the art would not understand the scope of the claims, and the specification's disclosure is tantamount to failing to disclose any structure at all. *Id*. at ¶¶ 7-9.

Plaintiff rebuts Mr. Kozlowski's declaration with a supplemental declaration from Dr. Hoffman, in which Dr. Hoffman explains that "a decoder is a circuit that has a great level of complexity as compared to a shift register," and that "nothing [in the '820 patent] would indicate the need or desire for needlessly complex circuitry." Plaintiff Ex. T at ¶¶ 4-6 (providing examples of additional complexity in using a decoder as a column addressing circuit). Dr. Hoffman also explains, among other things, that a bucket brigade shift register (a type of shift register that is not a shift register formed of a series of connected latches) "would not have been indicated for column addressing functions based upon its low charge transfer efficiency and the possible catastrophic results when used in a large-format focal plane." *Id*. at 9. Defendants did not submit a supplemental declaration in their sur-reply claim construction brief.

Based on the evidence before the court, the court finds that Defendants have not proved that a person of ordinary skill in the art would be unable to determine the scope of claim 1. Indeed, both experts agree that some level of structure is disclosed and that the disclosed structure would include at least a shift register formed of a series of connected latches. Though Defendants' expert identifies alternative structures that could possibly be used to perform the claimed function by causing successive columns to be enabled (and thus that the disclosure of structure is ambiguous), the court finds that Defendants have not shown, by clear and convincing evidence, that a person of ordinary skill in the art would be unable to identify the disclosed structure as a shift register formed of a series of connected latches.

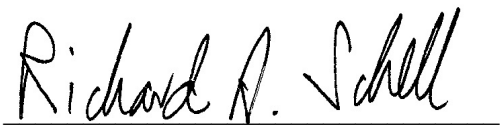
The court thus identifies the disclosed structure corresponding to the claimed function as "a shift register formed of a series of connected latches (and equivalent structures)."

CONCLUSION

Based on the foregoing, the court construes the disputed terms and limitations of the '663, '943, '437 and '820 patents as set forth above.

IT IS SO ORDERED.

SIGNED this the 18th day of January, 2010.



RICHARD A. SCHELL
UNITED STATES DISTRICT JUDGE